SEMESTER END EXAMINATION, MAY, 2024

Course Name: - B Tech **Semester:- IV**

Paper Name: - Computer Organization & Architecture **Paper Code:- TCS 404**

Time - 3 Hrs + 20 minutes per hour extra time for V.I. & examinees with writer. **Max Marks-70**

समय– 3 घण्टे + 20 मिनट प्रति घंटे अतिरिक्त–दृष्टिबाधित एवं साह लेखक परीक्षार्थियों के लिए। अधिकतम अंक–70

Instructions:

- The question paper consists of three sections namely A, B, C. All sections are compulsory.
- Section A- Each question carries **3 mark. All questions are compulsory**.
- Section B- Answer any **5 out of 7** given questions in maximum one hundred fifty (150) words. Each question carries **7 marks**.
- Section C- Answer any **2 out of 3** given questions in maximum three hundred (300) words. Each question carries **10 marks**.

निर्देश:

- प्रश्न पत्र में तीन खण्ड अ, ब, व स हैं। सभी खण्ड अनिवार्य हैं।
- खण्ड–अ में प्रत्येक प्रश्न **तीन अंक** का है। **सभी प्रश्न अनिवार्य हैं।**
- खण्ड–ब में **सात प्रश्नों में से किन्हीं पाँच** प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें। प्रत्येक प्रश्न **सात अंक** का है।
- खण्ड–स में **तीन प्रश्नों में से किन्हीं दो** प्रश्नों के उत्तर अधिकतम (250-300) शब्दों में दें। प्रत्येक प्रश्न **10 अंक** का है।

Section – A (खण्ड–अ)

Objective Questions (वस्तुनिष्ठ प्रश्न)

1. Answer all the following questions. 5x3 =15

निम्नलिखित सभी प्रश्न अनिवार्य हैं।

i) *What does ISA stand for?*

A) Instruction Set Architecture
B) Information Set Architecture
C) Indian Set Architecture
D) None of the above

ii) Zero address instructions are generally used in _____ architecture.

A) Stack
B) Queue
C) FIFO
D) LIFO

iii) The register that contains the instruction to be executed is called.

A) Stack Pointer
B) General Purpose Register
C) Program Counter
D) None of the above

iv) The time required for simple fetching and execution of a simple machine instruction is called as

A) Delay time
B) CPU cycle
C) Real Time
D) Seek Time

v) Each stage in pipelining should be completed in how many cycles?

A) 1
B) 2
C) 3
D) 4

Section – B (खण्ड–ब)

Short Answer Questions (लघुउत्तरीय प्रश्न)

2. Answer any five of the following questions in maximum 150 words. 5x7=35

निम्नलिखित में से किन्हीं पाँच प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें।

i. Write the signed and floating number representation structure with an example.
ii. Write down about various addressing modes with their suitable explanations.
iii. What are the characteristics of ripple carry adder and carry look ahead adder? Explain with mathematical expressions.
iv. What are the fundamental differences between RISC and CISC architectures? Provide examples of processors that embody each approach.
v. Explain the concept of pipelining in processor design. What are the advantages and challenges associated with pipelined processors?
vi. Describe the role of caches in a computer system. How does cache organization impact system performance?
vii. Discuss the various types of memory used in computer systems (e.g., RAM, ROM, registers). What are their respective roles and characteristics?

Section – C (खण्ड–स)

Descriptive Questions (विवरणात्मक प्रश्न)

3. Answer any two of the following question in maximum 300 words. 2x10=20

निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर अधिकतम 300 शब्दों में दें।

i) Write down the concept of pipelining with suitable diagram. Explain the types of hazards of it.

ii) Explain the differences of hardwired and microprogrammed control unit. Explain the design of a simple hypothetical CPU.

iii) Consider a set-associative cache with 8 sets, each containing 4 cache lines. The main memory consists of 1024 blocks. Calculate:

The size of each cache line in bytes if the cache is byte-addressable.

The total number of cache sets.

The number of bits required for cache index and block offset. (Assume block size is 64B)